

Correlation Studies on the Chromospheric Fine Structures and Magnetic Fields of The Quiet Sun

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In the present study, we have analyzed video magnetograms and high resolution H-alpha images of a solar quiet region to investigate morphology and evolution of quiet sun magnetic fields and chromospheric fine structures. The present observation has been performed for 7 hours to get time sequential longitudinal magnetograms and H-alpha images at Big Bear Solar Observatory on April 18, 1997. The field of view of the magnetograms is $382'' \times 271''$, and that of H-alpha images is $224'' \times 201''$.

We have made auto-correlation and cross-correlation analysis to derive the morphological and evolutionary characteristics of chromospheric fine structures and small magnetic elements on the quiet sun. Dark mottles are more prominent in H-alpha wing images and bright mottles in line center images. Dark mottles are found to be continuously changing and unstable, while bright mottles and rosette structure more stable and long-standing. And the bright mottles seem to be spatially coincided with rather enhanced quiet sun's magnetic elements. Since the overall configuration of magnetic elements shows no significant changes with time, bright mottles seem to be closely associated with enhanced magnetic patches gathered toward network boundaries. The average size of the network cell visible in H-alpha wing images and magnetograms is almost similar to that of the supergranule.